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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/931,252

08/17/2001

Takashi Yano

520.40478X00

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11/24/2003

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EXAMINER

ENG, MARSHALL S

ART UNIT

PAPER NUMBER

2133

DATE MAILED: 11/24/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/931,252

Applicant(s)

YANO ET AL.

Examiner

Marshall S Eng

Art Unit

2133

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other:

DETAILED ACTION

Priority

1.1 Receipt is acknowledged of a certified copy of the Japanese 2001-205542 application referred to in the oath or declaration or in an application data sheet. If this copy is being filed to obtain the benefits of the foreign filing date under 35 U.S.C. 119(a)-(d), applicant should also file a claim for such priority as required by 35 U.S.C. 119(b). If the application being examined is an original application filed under 35 U.S.C. 111(a) (other than a design application) on or after November 29, 2000, the claim for priority must be presented during the pendency of the application, and within the later of four months from the actual filing date of the application or sixteen months from the filing date of the prior foreign application. See 37 CFR 1.55(a)(1)(i). If the application being examined has entered the national stage from an international application filed on or after November 29, 2000, after compliance with 35 U.S.C. 371, the claim for priority must be made during the pendency of the application and within the time limit set forth in the PCT and Regulations of the PCT. See 37 CFR 1.55(a)(1)(ii). Any claim for priority under 35 U.S.C. 119(a)-(d) or (f) or 365(a) or (b) not presented within the time period set forth in 37 CFR 1.55(a)(1) is considered to have been waived. If a claim for foreign priority is presented after the time period set forth in 37 CFR 1.55(a)(1), the claim may be accepted if the claim properly identifies the prior foreign application and is accompanied by a grantable petition to accept an unintentionally delayed claim for priority. See 37 CFR 1.55(c).

1.2 Specifically, reference to the claim for priority under 35 USC 119 should be made in the specifications under a "Cross-Reference to Related Applications" heading before the beginning of the Background of the Invention. See MPEP 608.01(a) for the Arrangement of the Application.

Information Disclosure Statement

2.1 The paper filed as "Information for IDS" filed on 17 August 2001 fails to comply with 37 CFR 1.98(a)(1), which requires a list of all patents, publications, or other information submitted for consideration by the Office. It has been placed in the application file, but the information referred to therein has not been considered.

2.2 The paper filed as "Information for IDS" filed on 17 August 2001 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered.

2.3 Specifically, for consideration, the article by Yamaguchi et al. should be translated and submitted along with a formal IDS form.

Drawings

3.1 Figure 18 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

3.2 The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "201" has been used to designate both "turbo encoder" and "turbo decoder" in Figure 18.

3.3 The drawings are further objected to because the references 205, 208, 210, and 211 of figure 18 and references 11 and 17 of figure 16 spell the word "interleavor" incorrectly. It should be "interleaver" to match the spelling in the specifications.

3.4 The drawings are further objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 3a and 3b of Figure 15.

3.5 The drawings are further objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "4" of figure 15 has been used to designate both a base station and a wireless zone in the specifications, see lines 12 and 13 of page 23.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

4.1 The disclosure is objected to because of the following informalities: the word "an" on lines 22 and 23 of page 2 should be "a."

4.2 The disclosure is further objected to because of the following informalities: the word "error" on line 8 of page 3 should be "errors."

Appropriate corrections are required.

Claim Rejections - 35 USC § 103

5.1 The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5.2 This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5.3 Claim(s) 1-4 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. U.S. Patent Application Publication No. 2002/0168033 (hereinafter Suzuki).

As per claim 1,

Suzuki substantially teaches of a turbo decoder that is input turbo-encoded data, see page 3, paragraph 38. Suzuki further teaches of repeatedly carrying out turbo decoding a number of times to restore the originally transmitted data, see page 3, paragraph 40. Suzuki further teaches of judging the reliability of the soft outputted decoded result from statistics of the soft output result, see page 3, paragraphs 42 and 43. In paragraphs 42 and 43 Suzuki teaches of calculating the root mean square (a

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statistical measure) of the soft output and comparing (or judging) the result. Suzuki further teaches of controlling the number of iterations to run based on the judgment result, see pages 3 and 4, paragraph 44. In paragraph 44, Suzuki teaches of repeating the turbo decoding in accordance with the comparison result of the root mean square, hence Suzuki teaches of controlling the number of iterations (repetitions) based on the judgment result.

Suzuki does not explicitly teach of using the turbo encoding to correct errors.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use turbo-encoded data to help correct errors. It would have been obvious to one of ordinary skill because it is well known that error-correcting codes (such as turbo codes) are used to help detect and/or correct errors in transmitted data.

As per claim 2,

Suzuki, as noted above in claim 1, substantially teaches the limitations of claim 2.

With respect to the limitations of claim 2, Suzuki teaches of a signal-to-noise ratio estimation section used to estimate the signal-to-noise ratio of data on the basis of reliability information from the decoding section. The limitations of claim 2 are, as disclosed on page 9 of the specifications, comparing the signal power and noise power of a decoded data. With this in mind, the Examiner is reading the teachings of Suzuki to teach of comparing signal and noise power (as a ratio) and using the outcome of the comparison to carry out the repetition of the turbo decoding.

As per claim 3,

Suzuki, as noted above in claim 1, substantially teaches the limitations of claim 3.

With respect to the limitations of claim 3, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the comparison of the mean and minimum values of the soft output decoder as judging means. The limitations of claim 3 are comparing the minimum and the mean (average) values of the soft output decoder. It would have been obvious to one of ordinary skill in the art to use the observed mean and minimum values to help determine if further iterations/repetitions would be required. By comparing the minimum value and the mean (or average) value, one of ordinary skill would be able to determine how close or far the two values are from each other. If, for instance, the observed minimum value was much less than the mean value, then it would be obvious to one of ordinary skill that the reliability would be low and therefore would require more iterations. Further, if as described in figure 5 of the specifications, the minimum value multiplied by a constant was less than the mean, it is clear that the minimum value is (still) much smaller than the mean. Conversely, if the minimum value multiplied by a constant was greater than the mean, it would imply that the minimum value is closer, relatively speaking, to the mean value and hence have a higher reliability and not require more iterations.

As per claim 4,

Suzuki, as noted above in claim 1, substantially teaches the limitations of claim 4.

With respect to the limitations of claim 4, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the comparison of the maximum and minimum values of the soft output decoder as judging means. The limitations of claim 4 are comparing the maximum and minimum values of the soft

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output decoder. It would have been obvious to one of ordinary skill in the art to use the observed maximum and minimum values to help determine if further iterations/repetitions would be required. By comparing the maximum and minimum values, one of ordinary skill would be able to determine how far apart or close to each of the extreme values of the decoder are to one another. Obviously, the maximum value will always be greater than the minimum, but the use of their difference or ratio can be used to determine how close or far the two values are from each other. If, as described in figure 6 of the specifications, the minimum value multiplied by a constant were compared to the maximum value, it would have been obvious that if the min. value times the constant were greater than the maximum value, then the two values are relatively close and would require fewer, if any, extra iterations.

5.4 Claim(s) 5 and 6 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. U.S. Patent Application Publication No. 2002/0168033 (hereinafter Suzuki) in view of Dissosway et al. U.S. Patent No. 4,903,262 (hereinafter Dissosway).

As per claims 5 and 6,

Suzuki substantially teaches of a turbo decoder that decodes turbo encoded data, see page 3, paragraph 38, of judging the reliability of the soft outputted decoded result from statistics of the soft output result, see page 3, paragraphs 42 and 43, and of controlling the number of iterations to run based on the judgment result, see pages 3 and 4, paragraph 44.

Suzuki does not teach of the turbo decoder being part of a transmitter/receiver in a mobile communication system. Nonetheless, Suzuki does teach of turbo codes being

used in mobile communications to help improve error correcting ability in the transmission path.

Dissosway, in an analogous art, teaches of radio frequency circuit for transmitting and receiving radio frequency signals, a digital signal processor and a receiver (as part of the transceiver (transmitter-receiver), see column 31, claim 17, lines 15-25.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the turbo receiver of Suzuki to the transceiver Dissosway. This modification would have been obvious because one of ordinary skill in the art would have been motivated by the suggestion provided by Suzuki to use turbo encoders and decoders to help improve the error correcting ability of the communication path of mobile communication systems (or the like), see page 1, paragraph 2. Clearly, from the abstract of Dissosway, the system of Dissosway is a mobile communication system with mobile transceivers and mobile terminals.

Conclusion

6.1 The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- | | |
|----------------|--|
| a. Bohnke | US Patent Application Publication No. 2003/0033571 |
| b. Bohnke | US Patent No. 6,557,139 |
| c. Fukumasa | US Patent Application Publication No. 2003/0005388 |
| d. Nara | US Patent No. 5,978,414 |
| e. Jung et al. | US Patent Application Publication No. 2002/0056065 |
| f. Yi | US Patent No. 5,970,085 |

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- g. Yano et al. US Patent No. 6,526,539
- h. Yuan et al. US Patent Application Publication No. 2003/0023919
- i. Crozier et al. US Patent No. 6,510,536
- j. Hwang US Patent No. 6,532,249
- k. Shibutani et al. "Reducing average number of turbo decoding iterations"
- l. Kwon et al. "A modified two-step SOVA-based turbo decoder for low power and high performance"
- m. Leung et al. "Reducing power consumption of turbo code decoder using adaptive iteration with variable supply voltage"

6.2 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marshall S Eng whose telephone number is (703) 305-4638. The examiner can normally be reached on M-F, 9:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on (703) 305-9595. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3718.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.



mse



Albert DeCady
Primary Examiner